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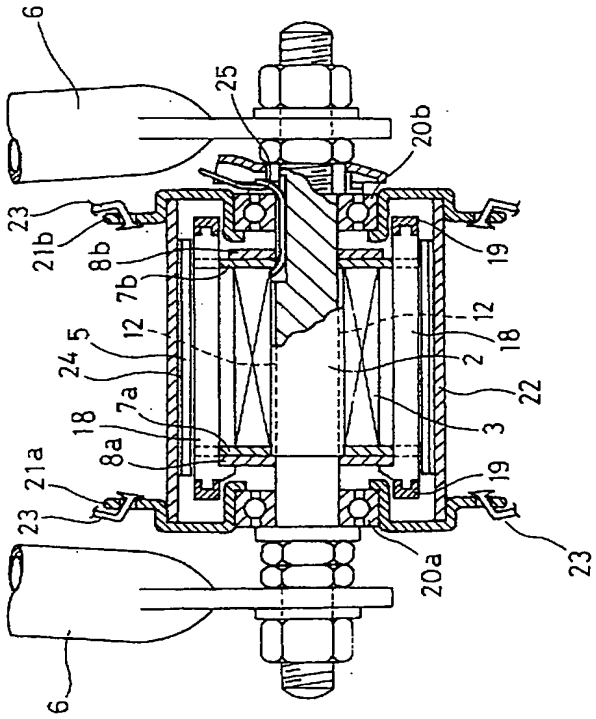
(54)【発明の名称】自転車用ダイナモ

(57)【要約】

【課題】　ハブの径を大きくしなくても多極化することができる自転車用ダイナモを提供することを目的とする。

【解決手段】　車輪と一体に回転するマグネット５とステータのうち、ステータを、コイル３の磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された側板８ａと、板状の磁性体で基端部が側板の前記磁極と磁気結合して先端が他方の磁極に向かって延設されたティース板１８とで構成し、板厚方向が前記ハブ１の回転方向と交差する方向にティース板１８を配設したことを特徴とし、ハブの周方向のティースの密度を上げることができ、ハブを大径化しなくても多極化できる。



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【特許請求の範囲】

【請求項１】自転車フレームのホークに取り付けられるハブの固定側に設けられたコイルと、
前記ハブの固定側に設けられ前記コイルの一方の磁極から他方の磁極に向かって延設されたティースを有するステータと、
前記ハブの回転側に設けられステータの前記ティースと対向して回転自在のマグネットとを有するハブ内蔵型自転車用ダイナモにおいて、
前記ステータを、
前記コイルの磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された側板と、
板状の磁性体で基端部が側板の前記磁極と磁気結合して先端が他方の磁極に向かって延設されたティース板とで構成し、
板厚方向が前記ハブの回転方向と交差する方向に前記ティース板を配設した自転車用ダイナモ。

【請求項２】円盤状の非磁性体で外周部に前記ティース板の板厚に応じた多数のスリットが形成されており、前記ティース板を収容して隣接するティース板の間隔保持を行う絶縁板を設けた請求項１記載の自転車用ダイナモ。

【請求項３】側板の外周には絶縁板のスリットのピッチの２倍のピッチで磁極を形成し、
側板の磁極の位置と磁極と磁極の中間位置に前記絶縁板のスリットが位置するように、側板と絶縁板とを重ねてハブの車軸に装着した請求項２記載の自転車用ダイナモ。

【請求項４】ハブの車軸の周面には、絶縁板の内周部に形成された突起に係合する溝を前記車軸の長手方向に沿って設け、
重ねてハブの車軸に装着される絶縁板と側板の互いの当接面には、側板の磁極の位置と磁極と磁極の中間位置に前記絶縁板のスリットが位置する状態で係合する凹部と凸部を形成した請求項３記載の自転車用ダイナモ。

【請求項５】ハブの車軸の周面に車軸の長手方向に絶縁板の位置決め用の溝を形成し、
前記の車軸に間隔をあけて装着した２枚の絶縁板を状態で互いの絶縁板のピッチが揃うように互いの絶縁板の内周面には同一位置に前記溝に係合する凸部を形成し、
重ねてハブの車軸に装着される前記絶縁板と側板の互いの当接面のうちの絶縁板の端面に凸部を設け、側板の端面に前記凸部に係合する貫通穴を形成し、かつ、前記側板に設けた前記貫通穴の位置を、絶縁板の前記凸部に対して周方向にスリットの１／２ピッチだけずらせて形成してある請求項４記載の自転車用ダイナモ。

【請求項６】自転車フレームのホークに取り付けられるハブの固定側に設けられたコイルと、
前記ハブの固定側に設けられ前記コイルの一方の磁極から他方の磁極に向かって延設されたティースを有するステータと、

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前記ハブの回転側に設けられステータの前記ティースと対向して回転自在のマグネットとを有するハブ内蔵型自転車用ダイナモにおいて、
前記ステータを、
前記コイルの両磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された一対の側板と、
板状の磁性体で基端部が側板の前記磁極と磁気結合して先端が他方の磁極に向かって延設されたティース板と、
円盤状の非磁性体で外周部に多数のスリットが形成された絶縁板を設け、前記テイース板の基端部を前記一対の側板の内の一方の側板と磁気結合させ、前記テイース板の先端部を前記絶縁板のスリットに係合して保持した自転車用ダイナモ。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、自転車フレームのホークに取り付けられるハブ内蔵型自転車用ダイナモに関するものである。

【０００２】

【従来の技術】図９～図１１は従来のハブ内蔵型自転車用ダイナモを示す。特開平６－３０５４６６号公報などに見られるこの種の自転車用ダイナモは、図９と図１０に示すように、自転車フレームのホークに取り付けられるハブ１の内部に、ハブ１の固定側としての車軸２に取り付けられたコイル３と、コイル３の一端から他端に向かって延設されたティース部を有するステータ４と、ハブ１の回転側に設けられステータ４のティース部と対向して回転自在のマグネット５などを内蔵させて構成されている。

【０００３】具体的には、ステータ４は図１０と図１１に示すように、磁性板をプレス加工で所定の形状に打ち抜き処理し、打ち抜かれたステータ板の外周のティース部４ａ，４ｂを図１１に示すように内側に折り曲げ加工されている。

【０００４】組み立ての際には、この図１１に示す形状の一対のステータ４でコイル３を中央にして、図１１に示すように一方のステータ４のティース４ａとティース４ａの間に他方のステータ４のティース４ｂが位置するように組み合わされている。

【０００５】このように一対のステータ４を組み合わせることによって、コイル３の外周部に多くのティース部４ａ，４ｂを配列することができ、自転車の車輪が回転してマグネット５が回転して、マグネット５の磁束をティース部４ａ，４ｂが切って、コイル３の端子間に電圧が発生する。

【０００６】このようなハブ内蔵型自転車用ダイナモは、タイヤドライブ式のダイナモに比べて騒音や振動が少なく使用感が良好である。

【０００７】

【発明が解決しようとする課題】しかしながら、タイヤドライブ式のダイナモに比べてハブ内蔵型自転車用ダイナモは、回転側の回転数が低くく、目的とする電力量を得るためには、特公平６－８８５４５号公報に見られるように増速機構を設けて回転数を上げるか、または特開平７－２９１１６６号公報に見られるようにティースの数を増やす（多極化）が必要である。

【０００８】増速機構を設けて回転数を上げた場合には、増速機構の耐久性によってダイナモの耐久性が著しく低下するとともに、回転抵抗と騒音が大きくなって、ハブ内蔵型自転車用ダイナモの有効な部分が損なわれる問題がある。

【０００９】これに対してティースの多極化は有効であるが、多極化のためにティースの幅を狭くすると強度が低下するので、ティースの幅には強度面の制約があり、ティースの多極化を実施するとハブ１の径が大きくなると云う問題がある。

【００１０】本発明は、ハブ１の径を大きくしなくても多極化することができる自転車用ダイナモを提供することを目的とする。

【００１１】

【課題を解決するための手段】本発明の自転車用ダイナモは、ステータを、コイルの磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された側板に対して、板状の磁性体のティース板をその板厚方向がハブの回転方向と交差する方向に配設したことを特徴とする。

【００１２】この本発明によると、ハブの径を大きくしなくても多極化した自転車用ダイナモを実現できる。

【００１３】

【発明の実施の形態】請求項１記載の自転車用ダイナモは、ステータを、コイルの磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された側板と、板状の磁性体で基端部が側板の前記磁極と磁気結合して先端が他方の磁極に向かって延設されたティース板とで構成し、板厚方向が前記ハブの回転方向と交差する方向に前記ティース板を配設したことを特徴とする。

【００１４】請求項２記載の自転車用ダイナモは、請求項１において、円盤状の非磁性体で外周部に前記ティース板の板厚に応じた多数のスリットが形成されており、前記ティース板を収容して隣接するティース板の間隔保持を行う絶縁板を設けたことを特徴とする。

【００１５】請求項３記載の自転車用ダイナモは、請求項２において、側板の外周には絶縁板のスリットのピッチの２倍のピッチで磁極を形成し、側板の磁極の位置と磁極と磁極の中間位置に前記絶縁板のスリットが位置するように、側板と絶縁板とを重ねてハブの車軸に装着したことを特徴とする。

【００１６】請求項４記載の自転車用ダイナモは、請求項３において、ハブの車軸の周面には、絶縁板の内周部に形成された突起に係合する溝を前記車軸の長手方向に沿って設け、重ねてハブの車軸に装着される絶縁板と側板の互いの当接面には、側板の磁極の位置と磁極と磁極の中間位置に前記絶縁板のスリットが位置する状態で係合する凹部と凸部を形成したことを特徴とする。

【００１７】請求項５記載の自転車用ダイナモは、請求項４において、ハブの車軸の周面に車軸の長手方向に絶縁板の位置決め用の溝を形成し、前記の車軸に間隔をあけて装着した２枚の絶縁板を状態で互いの絶縁板のピッチが揃うように互いの絶縁板の内周面には同一位置に前記溝に係合する凸部を形成し、重ねてハブの車軸に装着される前記絶縁板と側板の互いの当接面のうちの絶縁板の端面に凸部を設け、側板の端面に前記凸部に係合する貫通穴を形成し、かつ、前記側板に設けた前記貫通穴の位置を、絶縁板の前記凸部に対して周方向にスリットの１／２ピッチだけずらせて形成してあることを特徴とする。

【００１８】請求項６記載の自転車用ダイナモは、自転車フレームのホークに取り付けられるハブの固定側に設けられたコイルと、前記ハブの固定側に設けられ前記コイルの一方の磁極から他方の磁極に向かって延設されたティースを有するステータと、前記ハブの回転側に設けられステータの前記ティースと対向して回転自在のマグネットとを有するハブ内蔵型自転車用ダイナモにおいて、前記ステータを、前記コイルの両磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された一対の側板と、前記テイース板の基端部を前記一対の側板の内の一方の側板と磁気結合させ、前記テイース板の先端部を前記絶縁板のスリットに係合して保持したことを特徴とする。

【００１９】以下、本発明の各実施の形態を図１～図８に基づいて説明する。

（実施の形態１）図１～図７は（実施の形態１）を示す。

【００２０】図１に示すように自転車フレームのホーク６の間に取り付けられるハブ１の車軸２には、中央にコイル３が設けられている。コイル３は分割し、並列巻き、直列巻きの何れでもよい。

【００２１】コイル３の両側には、非磁性体の例えば樹脂製の絶縁板７ａ，７ｂを介して、磁性体からなる側板８ａ，８ｂが組み付けられている。絶縁板７ａ，７ｂと側板８ａ，８ｂは共に円盤状で、絶縁板７ａ，７ｂの外周部には図２と図３に示すように定ピッチで多数のスリット９が形成されている。側板８ａ，８ｂの外周部には図２と図４に示すように定ピッチで多数の脚部１０が形成されている。

【００２２】絶縁板７ａ，７ｂの中央には車軸２が貫通する中心孔１１が穿設されており、中心孔１１には車軸２の周面に軸芯方向に形成された２本の溝１２に係合する突起１３ａ，１３ｂが形成されており、車軸２にセッ

トした状態で絶縁板７ａ，７ｂの前記スリット９の車軸２の周方向の位置は一致する。

【００２３】側板８ａ，８ｂの中央には車軸２が貫通する中心孔１４が穿設されているが、絶縁板７ａ，７ｂのように車軸２の溝１２に係合する突起１３ａ，１３ｂに相当する突起は形成されていないが、絶縁板７ａ，７ｂの端面に形成された凸部１５ａ，１５ｂに係合する貫通孔１６ａ，１６ｂが穿設されている。

【００２４】具体的には、絶縁板７ａ，７ｂの端面には、図３に示すように突起１３ａの位置に対応して凸部１５ａが形成され、突起１３ｂの位置に対してスリット９のピッチの１／２ピッチの角度（１／２）θだけずれた位置に凸部１５ｂが形成されている。側板８ａ，８ｂには、同様に角度（１／２）θだけずれた位置に貫通孔１６ａ，１６ｂが形成されている。

【００２５】従って、図１に示すコイル３の左側の絶縁板７ａと側板８ａを重ね合わせて車軸２に装着することによって、図５の（ａ）に示す絶縁板７ａのスリット９と側板８ａの脚部１０の位置関係は、図５の（ｂ）に示すようになる。

【００２６】コイル３の右側の絶縁板７ｂと側板８ｂを重ね合わせて車軸２に装着することによって、図５の（ｃ）に示す絶縁板７ｂのスリット９と側板８ｂの脚部１０の位置関係は、図５の（ｄ）に示すようになる。

【００２７】この図５の（ｃ）（ｄ）を比較して分かるように、コイル３の左側と右側とでスリット９と脚部１０とが一致する角度が異なっており、左側の絶縁板７ａと側板８ａでスリット９と脚部１０とが一致している角度では、その右側の絶縁板７ｂと側板８ｂのスリット９と脚部１０とは一致していない。右側の絶縁板７ｂと側板８ｂでスリット９と脚部１０とが一致している角度では、その左側の絶縁板７ａと側板８ａのスリット９と脚部１０とは一致していない。

【００２８】換言すると、スリット９と脚部１０とが一致している反対側では、その角度ではスリット９の位置が脚部１０と脚部１０の間の凹部１７の位置になっているように位置決めされている。

【００２９】この絶縁板７ａ，７ｂのスリット９には、図６に示すように磁性体からなる板状のティース板１８が、隣接するスリットごとにティース板１８の向きを左右入れ替えて絶縁板７ａ，７ｂの全周にわたって挿入されている。

【００３０】ティース板１８の形状は、スリット９に挿入された状態で一方の側板の端面に接して磁気抵抗の少ない磁路を形成する脚１８ａが形成されており、ここでは図６に示すようにティース板１８の脚１８ａが側板８ａ，８ｂに当接するように組み立てられている。

【００３１】ここでは図６に示すようにティース板１８の脚１８ａが側板８ａ，８ｂに当接するように組み立てられている。なお、上記のように組み付けられた多数のティース板１８の端部は、図１と図２に示すように非磁性体のリング１９をティース板１８の連結突起１８ｂに差し込んで位置決めされている。

【００３２】車軸２には、側板８ａ，８ｂの外側にベアリング２０ａ，２０ｂを介してハブ鍔２１ａ，２１ｂが取り付けられている。ハブ鍔２１ａとハブ鍔２１ｂの間は、前記ティース板１８の外側で筒体２２によって連結されている。２３はスポークである。

【００３３】筒体２２の内側には、非磁性体のシート２４を介してマグネット５が取り付けられており、車輪が回転することによって多数のティース板１８の外側で、このティース板に近接した位置をマグネット５が回転することになり、ティース板１８がマグネット５の磁束を切ることによってコイル３に起電力が発生する。

【００３４】コイル３の起電力は、車軸２の溝１２に沿って敷設されたリード線２５によってリムの外部に引き出されて電気負荷に給電される。なお、磁路の磁気抵抗を必要な程度に減少できない場合には、ティース板１８の脚１８ａと側板８ａ，８ｂとの当接している部分を溶接などで繋いだりしてティース板１８の脚１８ａと側板８ａ，８ｂとの当接箇所の磁気抵抗を低減したり、図７に示すように図１に示した車軸２に形成されたネジ部２ａに磁性体のナット２５を締め込んで側板８ａ，８ｂと車軸２との間の磁気抵抗を低減することができる。

【００３５】このように、ティース板１８は前記ハブの回転方向と交差する方向に板厚方向が揃うように絶縁板７ａ，７ｂのスリット９に差し込んで構成しているため、ティースの長さを長く延ばしても強度の低下が少なく、性能が向上するとともに、従来に比べて多極の自転車用ダイナモを小径にして実現できる。

【００３６】図５を見てわかるように絶縁板７ａと側板８ａ、絶縁板７ｂと側板８ｂとの位置合わせのための凸部１５ａ，１５ｂと貫通孔１６ａ，１６ｂの位置を、１８０°の位相差ではなく、（１／２）θだけ故意にずらせて形成したので、左右の側板８ａ，８ｂの位置合わせが容易で、しかも、絶縁板７ａと絶縁板７ｂ、および側板８ａと側板８ｂとは同一形状の部品で済むため、部品種類の削減を実現できる。

【００３７】具体的には、図５の（ｂ）に示す左側の絶縁板７ａの凸部１５ａには側板８ａの貫通孔１６ａが係合し、凸部１５ｂには側板８ａの貫通孔１６ｂが係合しているのに対して、図５の（ｄ）に示す右側では、絶縁板７ｂに対して側板８ｂを裏返しにするとともに、絶縁板７ｂの凸部１５ａに側板８ｂの貫通孔１６ｂを係合させ、絶縁板７ｂの凸部１５ｂに側板８ｂの貫通孔１６ａを係合させるだけで、左右の側板８ａ，８ｂの位置合わせが完了し、また、図６に示したようにコイル３の左側から右側に向かって延びるティース板１８と、コイル３の右側から左側に向かって延びるティース板１８とを交互にスリット９に挿入できる目的の形状を少ない部品種

類で実現している。

【００３８】（実施の形態２）図８は（実施の形態２）を示す。上記の（実施の形態１）では、絶縁板７ａ，７ｂのスリット９に挿入して保持すると共にティース板１８の両端にリング１９，１９を取り付けて多数のティース板１８の車軸２の側への取り付けを確実にしていたが、この（実施の形態２）では、ティース板１８の中央付近に凹２６を形成しておき、各ティース板１８をセットした後に環状のコイルスプリング２７を、磁性的に絶縁体の絶縁テープ２８を介在させてティース板１８の相互を締め付けることもできる。この場合にもリング１９，１９を併用することもできる。

【００３９】

【発明の効果】以上のように本発明の自転車用ダイナモによれば、ステータを、コイルの磁極に近接して配置された円盤状の磁性体で外周部に多数の磁極が形成された側板と、板状の磁性体で基端部が側板の前記磁極と磁気結合して先端が他方の磁極に向かって延設されたティース板とで構成し、板厚方向が前記ハブの回転方向と交差する方向に前記ティース板を配設したことを特徴とし、ハブの周方向のティースの密度を上げることができ、ハブを大径化しなくても多極化することができる。

【００４０】また、円盤状の非磁性体で外周部に前記ティース板の板厚に応じた多数のスリットが形成されており、前記ティース板を収容して隣接するティース板の間隔保持を行う絶縁板を設けた場合には、前記ティース板を目的とする姿勢に確実に保持できる。

【００４１】また、側板の外周には絶縁板のスリットのピッチの２倍のピッチで磁極を形成し、側板の磁極の位置と磁極と磁極の中間位置に前記絶縁板のスリットが位置するように、側板と絶縁板とを重ねてハブの車軸に装着することによって、コイルの一端から他端に延びる前記ティース板を目的とする姿勢に確実に保持できる。

【００４２】また、ハブの車軸の周面には、絶縁板の内周部に形成された突起に係合する溝を前記車軸の長手方向に沿って設け、重ねてハブの車軸に装着される絶縁板と側板の互いの当接面には、側板の磁極の位置と磁極と磁極の中間位置に前記絶縁板のスリットが位置する状態で係合する凹部と凸部を形成した場合には、車軸と絶縁板と側板の相互の位置合わせが完了する。

【００４３】さらに、ハブの車軸の周面に車軸の長手方向に絶縁板の位置決め用の溝を形成し、前記の車軸に間隔をあけて装着した２枚の絶縁板を状態で互いの絶縁板のピッチが揃うように互いの絶縁板の内周面には同一位置に前記溝に係合する凸部を形成し、重ねてハブの車軸に装着される前記絶縁板と側板の互いの当接面のうちの絶縁板の端面に凸部を設け、側板の端面に前記凸部に係合する貫通穴を形成し、かつ、前記側板に設けた前記貫通穴の位置を、絶縁板の前記凸部に対して周方向にスリットの１／２ピッチだけずらせて形成することによって、車軸の左右の絶縁板と側板として同一の形状の部品を使用することができ、部品種類の削減を達成することができる。

【００４４】また、円盤状の非磁性体で外周部に多数のスリットが形成された絶縁板を設け、前記テイース板の基端部を前記一対の側板の内の一方の側板と磁気結合させ、前記テイース板の先端部を前記絶縁板のスリットに係合して保持することによって、細長いテイース板を安定に支持して多極化を実現できる。

【図面の簡単な説明】

【図１】本発明の（実施の形態１）の自転車用ダイナモの要部断面図

【図２】同実施の形態の要部の分解斜視図

【図３】同実施の形態の絶縁板の平面図

【図４】同実施の形態の側板の平面図

【図５】同実施の形態の左右の絶縁板と側板との重ね合わせの説明図

【図６】同実施の形態のティース板の挿入工程を示す斜視図

【図７】同実施の形態の組み立ての別の例を示す断面図

【図８】（実施の形態２）の要部を示す斜視図

【図９】従来の自転車用ダイナモの断面図

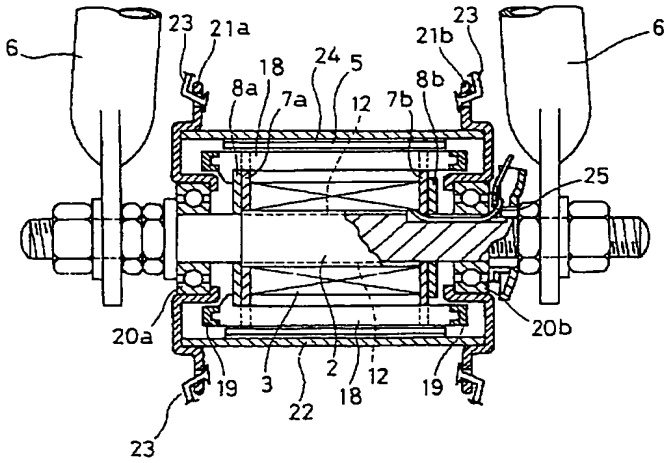
【図１０】同従来例の横断面図

【図１１】同従来例のステータの断面図

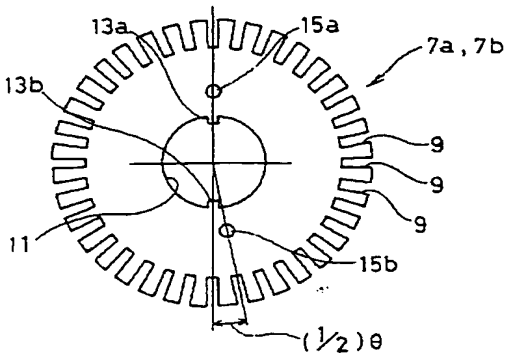
【符号の説明】

６　自転車フレームのホーク
１　ハブ
２　車軸
３　コイル
７ａ，７ｂ　非磁性体の絶縁板
８ａ，８ｂ　磁性体からなる側板
９　絶縁板のスリット
１０　側板の脚部
１２　車軸の溝
１３ａ，１３ｂ　絶縁板の突起
１５ａ，１５ｂ　絶縁板の端面に形成された凸部
１６ａ，１６ｂ　側板の貫通孔
１８　磁性体からなる板状のティース板

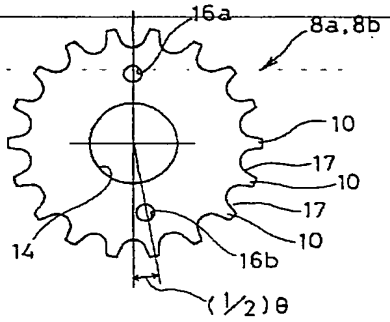
【図１】



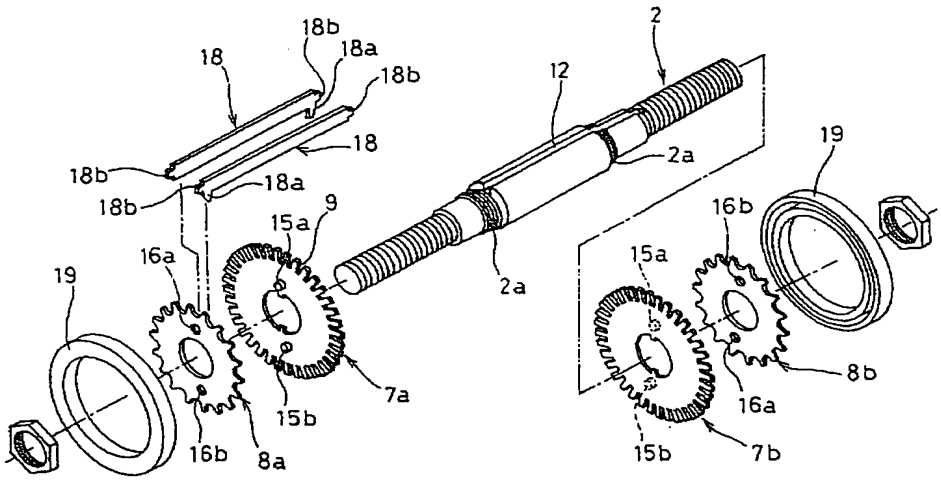
【図３】



【図４】



【図２】



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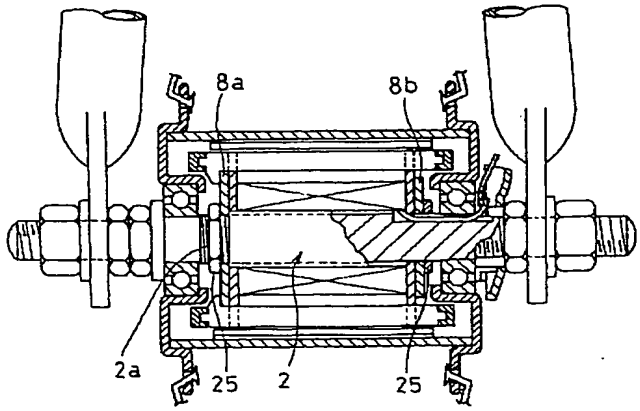

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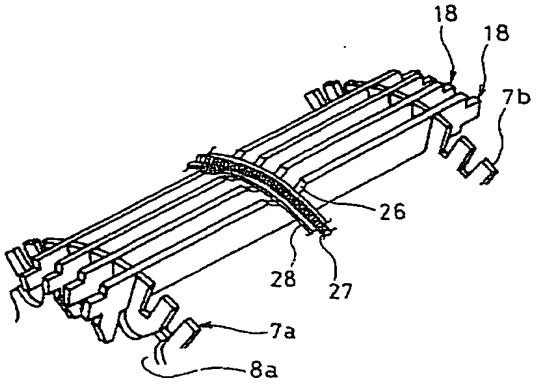

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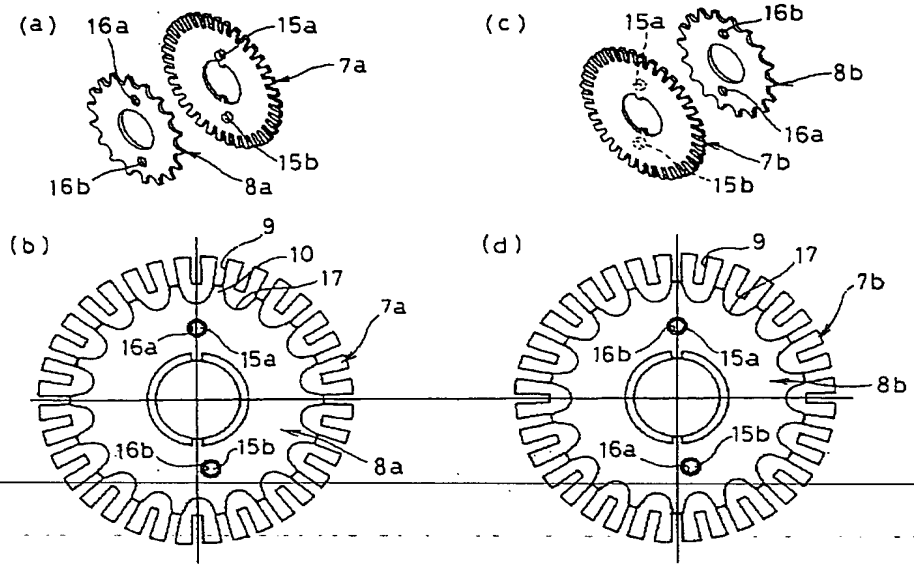
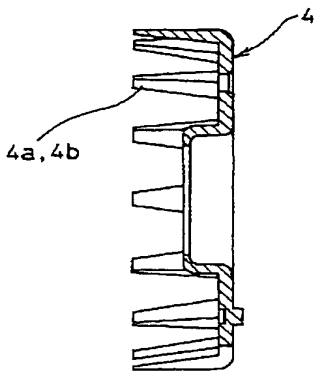
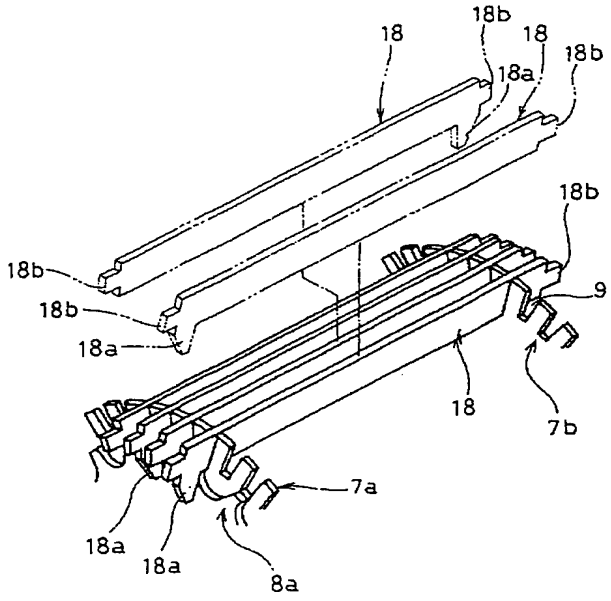

(a)
16a
15a
7a
15b
16b
8a
(c)
15a
16b
8b
16a
7b
15b
(b)
9
10
17
7a
16a
15a
16b
15b
8a
(d)
9
17
7b
16b
15a
8b
16a
15b

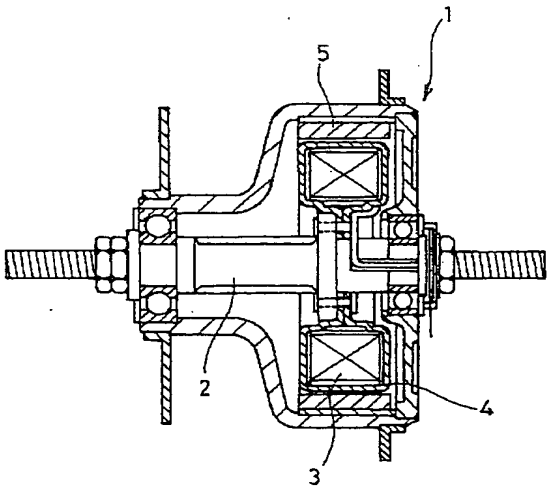
【図１１】


4
4a,4b

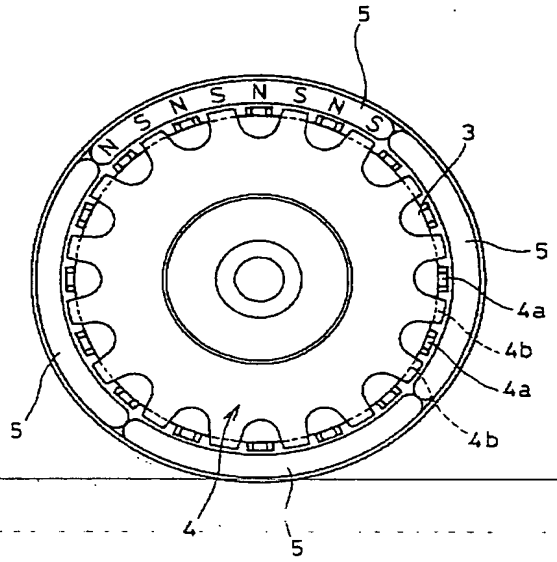
【図６】


18
18b
18
18b
18a
18b
18b
18b
9
18a
18
7b
7a
18a
18a
8a

【図９】


1
5
2
4
3

【図１０】



PATENT ABSTRACTS OF JAPAN

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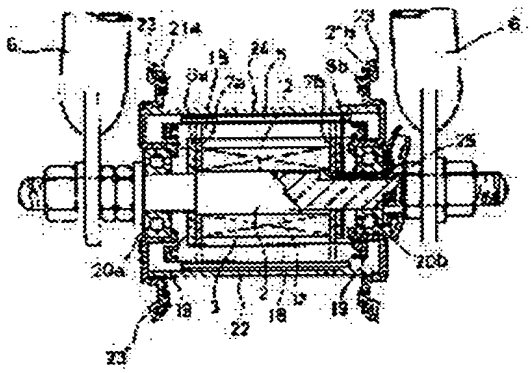
(54) DYNAMOTOR FOR BICYCLE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a dynamotor for a bicycle capable of being made multipolar without increasing the diameter of a hub.

SOLUTION: A magnet 5 and a stator are rotated together with a wheel. The stator is constituted of a side plate 8a made of a disk-like magnetic body arranged near the magnetic poles of a coil 3 and formed with many magnetic poles on the outer peripheral section and a teeth plate 18 made of a plate-like magnetic body and magnetically coupled with the magnetic poles of the side plate 8a at the base end section and extended toward the other magnetic poles at the tip. The teeth plate 18 is arranged so that its thickness direction crosses the rotating direction of 1. The density of the teeth in the peripheral direction of the hub 1 can be increased, therefore this dynamotor can be made multipolar without increasing the diameter of the hub 1.



LEGAL STATUS

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[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

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[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] The coil prepared in the fixed side of the hub attached in the fork of a bicycle frame, The stator which has the teeth which were prepared in the fixed side of said hub and installed toward the magnetic pole of another side from one magnetic pole of said coil, In the DYNAMO for hub built-in bicycles which is formed in a said hub revolution-side, counters with said teeth of a stator, and has the magnet which can rotate freely The side plate by which many magnetic poles were formed in the periphery section with the disc-like magnetic substance arranged by approaching the magnetic pole of said coil in said stator, DYNAMO for bicycles which arranged said teeth plate in the direction in which it constitutes from a teeth plate with which the end face section carried out magnetic connection to said magnetic pole of a side plate the tabular magnetic substance, and the head was installed toward the magnetic pole of another side, and the direction of board thickness intersects the hand of cut of said hub.
[Claim 2] DYNAMO for bicycles according to claim 1 which formed the electric insulating plate which performs spacing of the teeth plate which the slit of a large number according to the board thickness of said teeth plate is formed in the periphery section with a disc-like non-magnetic material, holds said teeth plate, and adjoins.
[Claim 3] DYNAMO for bicycles according to claim 2 which equipped the axle of a hub with the side plate and the electric insulating plate in piles so that a magnetic pole might be formed in the periphery of a side plate in a pitch twice the pitch of the slit of an electric insulating plate and the slit of said electric insulating plate might be located in the mid-position of the location of the magnetic pole of a side plate, a magnetic pole, and a magnetic pole.
[Claim 4] DYNAMO for bicycles according to claim 3 in which the crevice which engages with the mutual contact side of the electric insulating plate with which establishes the slot which engages with the projection formed in the inner circumference section of an electric insulating plate along with the longitudinal direction of said axle in the peripheral surface of the axle of a hub, and the axle of a hub is equipped in piles, and a side plate in the condition that the slit of said electric insulating plate is located in the mid-position of the location of the magnetic pole of a side plate, a magnetic pole, and a magnetic pole, and heights were formed.
[Claim 5] The slot for positioning of an electric insulating plate is formed in the peripheral surface of the axle of a hub at the longitudinal direction of an axle. The heights which engage with the same location in said slot are formed in the inner skin of a mutual electric insulating plate so that the pitch of a mutual electric insulating plate may gather in the condition the electric insulating plate of two sheets which opened and equipped the aforementioned axle with spacing. Heights are prepared in the end face of the electric insulating plate of the mutual contact sides of said electric insulating plate with which the axle of a hub is equipped in piles, and a side plate. DYNAMO for bicycles according to claim 4 which only 1/2 pitch of a slit can shift the location of said through hole which formed in the end face of a side plate the through hole which engages with said heights, and was established in said side plate to a hoop direction to said heights of an electric insulating plate, and has been formed.
[Claim 6] The coil prepared in the fixed side of the hub attached in the fork of a bicycle frame, The stator which has the teeth which were prepared in the fixed side of said hub and installed toward the magnetic pole of another side from one magnetic pole of said coil, In the DYNAMO for hub built-in bicycles which is formed in a said hub revolution-side, counters with said teeth of a stator, and has the magnet which can rotate freely The side plate of the couple by which many magnetic poles were formed in the periphery section with the disc-like magnetic substance arranged by approaching both the magnetic poles of said coil in said stator, The teeth plate with which the end face section carried out magnetic connection to said magnetic pole of a side plate the tabular magnetic substance, and the head was installed toward the magnetic pole of another side, DYNAMO for bicycles which forms the electric insulating plate by which many slits were formed in the periphery section with a disc-like non-magnetic material, was made to carry out magnetic connection of the end face section of said teeth plate to one side plate of the side plates of said couple, engaged with the slit of said electric insulating plate, and held the point of said teeth plate.

[Translation done.]

* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the DYNAMO for hub built-in bicycles attached in the fork of a bicycle frame.
[0002]
[Description of the Prior Art] Drawing 9 - drawing 11 show the conventional DYNAMO for hub built-in bicycles. This kind looked at by JP,6-305466,A etc. of DYNAMO for bicycles The coil 3 attached in the interior of the hub 1 attached in the fork of a bicycle frame at the axle 2 as a fixed side of a hub 1 as shown in drawing 9 and drawing 10 , It is prepared in a stator [which has the teeth section installed toward the other end from the end of a coil 3] 4, and hub 1 revolution-side, counter with the teeth section of a stator 4, the magnet 5 which can rotate freely is made to build in, and it is constituted.
[0003] As shown in drawing 10 and drawing 11 , a magnetic plate is pierced in a configuration predetermined by press working of sheet metal, and it processes, and specifically, the stator 4 is bent and processed inside in the teeth sections 4a and 4b of the periphery of the pierced stator plate, as shown in drawing 11 .
[0004] In the case of an assembly, it is together put so that teeth 4b of the stator 4 of another side may be located between teeth 4a of a stator 4, and teeth 4a, as a coil 3 is carried out in the center by the stator 4 of the couple of the configuration shown in this drawing 11 and while shows drawing 11 .
[0005] Thus, by combining the stator 4 of a couple, many teeth sections 4a and 4b can be arranged in the periphery section of a coil 3, the wheel of a bicycle rotates, a magnet 5 rotates, the teeth sections 4a and 4b cut the magnetic flux of a magnet 5, and an electrical potential difference occurs between the terminals of a coil 3.
[0006] Compared with the DYNAMO of a tire drive type, there are few noise and oscillations and such DYNAMO for hub built-in bicycles has a good feeling of an activity.
[0007]
[Problem(s) to be Solved by the Invention] however, in order to acquire the electric energy which the DYNAMO for hub built-in bicycles is low compared with the DYNAMO of a tire drive type, and the rotational frequency by the side of a revolution makes ** and the object, a speed-increasing system is established, and a rotational frequency is raised, or JP,7-291166,A sees so that JP,6-88545,B may see -- as -- the number of teeth -- increasing (multipolarization) -- it is required.
[0008] When a speed-increasing system is established and a rotational frequency is raised, while the endurance of DYNAMO falls remarkably with the endurance of a speed-increasing system, rotational resistance and the noise become large and there is a problem by which the effective part of the DYNAMO for hub built-in bicycles is harmed.
[0009] On the other hand, although multipolarization of teeth is effective, since reinforcement will fall if width of face of teeth is narrowed for multipolarization, when the width of face of teeth has constraint of a side on the strength and teeth are multipolarized, there is a problem which says that the path of a hub 1 becomes large.
[0010] This invention aims at offering the DYNAMO for bicycles which can be multipolarized even if it does not enlarge the path of a hub 1.
[0011]
[Means for Solving the Problem] The DYNAMO for bicycles of this invention is characterized by arranging the teeth plate of the tabular magnetic substance in the direction in which the direction of board thickness intersects the hand of cut of a hub to the side plate by which many magnetic poles were formed in the periphery section with the disc-like magnetic substance arranged by approaching the magnetic pole of a coil in the stator.
[0012] According to this this invention, the DYNAMO for bicycles multipolarized even if it did not enlarge the

path of a hub is realizable.
[0013]
[Embodiment of the Invention] The side plate by which many magnetic poles were formed in the periphery section with the disc-like magnetic substance arranged by the DYNAMO for bicycles according to claim 1 approaching the magnetic pole of a coil in a stator, It constitutes from a teeth plate with which the end face section carried out magnetic connection to said magnetic pole of a side plate the tabular magnetic substance, and the head was installed toward the magnetic pole of another side, and is characterized by arranging said teeth plate in the direction in which the direction of board thickness intersects the hand of cut of said hub.
[0014] In claim 1, the slit of a large number according to the board thickness of said teeth plate is formed in the periphery section with a disc-like non-magnetic material, and the DYNAMO for bicycles according to claim 2 is characterized by forming the electric insulating plate which performs spacing of the teeth plate which holds said teeth plate and adjoins.
[0015] In claim 2, the DYNAMO for bicycles according to claim 3 is characterized by equipping the axle of a hub with a side plate and an electric insulating plate in piles so that a magnetic pole may be formed in the periphery of a side plate in a pitch twice the pitch of the slit of an electric insulating plate and the slit of said electric insulating plate may be located in the mid-position of the location of the magnetic pole of a side plate, a magnetic pole, and a magnetic pole.
[0016] The DYNAMO for bicycles according to claim 4 is set to claim 3. To the peripheral surface of the axle of a hub In the mutual contact side of the electric insulating plate with which prepares the slot which engages with the projection formed in the inner circumference section of an electric insulating plate along with the longitudinal direction of said axle, and the axle of a hub is equipped in piles, and a side plate It is characterized by forming the crevice engaged in the condition that the slit of said electric insulating plate is located in the mid-position of the location of the magnetic pole of a side plate, a magnetic pole, and a magnetic pole, and heights.
[0017] The DYNAMO for bicycles according to claim 5 forms the slot for positioning of an electric insulating plate in the peripheral surface of the axle of a hub in claim 4 at the longitudinal direction of an axle. The heights which engage with the same location in said slot are formed in the inner skin of a mutual electric insulating plate so that the pitch of a mutual electric insulating plate may gather in the condition the electric insulating plate of two sheets which opened and equipped the aforementioned axle with spacing. Heights are prepared in the end face of the electric insulating plate of the mutual contact sides of said electric insulating plate with which the axle of a hub is equipped in piles, and a side plate. It is characterized by only for 1/2 pitch of a slit being able to shift the location of said through hole which formed in the end face of a side plate the through hole which engages with said heights, and was established in said side plate to a hoop direction to said heights of an electric insulating plate, and having formed.
[0018] The coil prepared in the fixed side of the hub where the DYNAMO for bicycles according to claim 6 is attached in the fork of a bicycle frame, The stator which has the teeth which were prepared in the fixed side of said hub and installed toward the magnetic pole of another side from one magnetic pole of said coil, In the DYNAMO for hub built-in bicycles which is formed in a said hub revolution-side, counters with said teeth of a stator, and has the magnet which can rotate freely The side plate of the couple by which many magnetic poles were formed in the periphery section with the disc-like magnetic substance arranged by approaching both the magnetic poles of said coil in said stator, Magnetic connection of the end face section of said teeth plate is carried out to one side plate of the side plates of said couple, and it is characterized by having engaged with the slit of said electric insulating plate, and holding the point of said teeth plate.
[0019] Hereafter, the gestalt of each operation of this invention is explained based on drawing 1 - drawing 8 .
(Gestalt 1 of operation) Drawing 1 - drawing 7 show (the gestalt 1 of operation).
[0020] The coil 3 is formed in the center at the axle 2 of a hub 1 attached between the forks 6 of a bicycle frame as shown in drawing 1 . A coil 3 may be divided and any of a juxtaposition volume and a serial volume are sufficient as it.
[0021] The side plates 8a and 8b which consist of the magnetic substance are attached to the both sides of a coil 3 through the electric insulating plates 7a and 7b made of non-magnetic material, for example, resin. Both electric insulating plates 7a and 7b and the side plates 8a and 8b are disc-like, and as shown in drawing 2 and drawing 3 , many slits 9 are formed in the periphery section of electric insulating plates 7a and 7b in the constant pitch. As shown in drawing 2 and drawing 4 , much legs 10 are formed in the periphery section of side plates 8a and 8b in the constant pitch.
[0022] The feed hole 11 which an axle 2 penetrates is drilled in the center of electric insulating plates 7a and 7b, the

projections 13a and 13b which engage with two slots 12 formed in the direction of an axis at the peripheral surface of an axle 2 are formed in the feed hole 11, and the location of the hoop direction of the axle 2 of said slit 9 of electric insulating plates 7a and 7b is in agreement in the condition of having set to the axle 2.

[0023] Although the projection which is equivalent to the projections 13a and 13b which engage with the slot 12 of an axle 2 like electric insulating plates 7a and 7b although the feed hole 14 which an axle 2 penetrates is drilled in the center of side plates 8a and 8b is not formed, the breakthroughs 16a and 16b which engage with the heights 15a and 15b formed in the end face of electric insulating plates 7a and 7b are drilled.

[0024] As shown in drawing 3 , corresponding to the location of projection 13a, heights 15a is specifically formed in the end face of electric insulating plates 7a and 7b, and heights 15b is formed in the location where only the include angle theta of 1/2 pitch of the pitch of a slit 9 (1/2) shifted to the location of projection 13b. Breakthroughs 16a and 16b are formed in the location where only the include angle (1/2) theta shifted to side plates 8a and 8b similarly.

[0025] Therefore, by piling up left-hand side electric insulating plate 7a and side plate 8a of the coil 3 shown in drawing 1 , and equipping an axle 2 comes to show the physical relationship of the slit 9 of electric insulating plate 7a, and the leg 10 of side plate 8a shown in (a) of drawing 5 to (b) of drawing 5 .

[0026] By piling up right-hand side electric insulating plate 7b and side plate 8b of a coil 3, and equipping an axle 2 comes to show the physical relationship of the slit 9 of electric insulating plate 7b, and the leg 10 of side plate 8b shown in (c) of drawing 5 to (d) of drawing 5 .

[0027] The left-hand side of a coil 3 differs in the include angle a slit 9 and whose leg 10 correspond from right-hand side, and the slit 9 and the leg 10 of electric insulating plate 7b of that right-hand side and side plate 8b are not in agreement at the include angle a slit 9 and whose leg 10 correspond by left-hand side electric insulating plate 7a and side plate 8a so that (c) of this drawing 5 and (d) may be compared and understood. At the include angle a slit 9 and whose leg 10 correspond by right-hand side electric insulating plate 7b and side plate 8b, the slit 9 and the leg 10 of electric insulating plate 7a of the left-hand side and side plate 8a are not in agreement.

[0028] If it puts in another way, at the include angle, it is positioned in the opposite hand a slit 9 and whose leg 10 correspond as the location of a slit 9 is the location of the crevice 17 between the leg 10 and the leg 10.

[0029] The sense of the teeth plate 18 is inserted in the tabular teeth plate 18 which becomes the slit 9 of these electric insulating plates 7a and 7b from the magnetic substance as shown in drawing 6 over the perimeter of right-and-left exchange ******** 7a and 7b for every adjoining slit.

[0030] Foot 18a which forms a magnetic path with little magnetic reluctance in contact with the end face of one side plate in the condition of having been inserted in the slit 9 is formed, and the configuration of the teeth plate 18 is assembled so that foot 18a of the teeth plate 18 may contact side plates 8a and 8b, as shown in drawing 6 here.

[0031] Here, it is assembled so that foot 18a of the teeth plate 18 may contact side plates 8a and 8b, as shown in drawing 6 . In addition, the ring 19 of non-magnetic material is inserted in connection projection 18b of the teeth plate 18, and the edge of the teeth plate 18 of a large number attached as mentioned above is positioned, as shown in drawing 1 and drawing 2 .

[0032] Hub ** 21a and 21b are attached in the outside of side plates 8a and 8b through Bearings 20a and 20b at the axle 2. Between hub ** 21a and hub ** 21b, it is connected by the barrel 22 on the outside of said teeth plate 18. 23 is a spoke.

[0033] Inside the barrel 22, the magnet 5 is attached through the sheet 24 of non-magnetic material, and a magnet 5 will rotate the location close to this teeth plate on the outside of many teeth plates 18, and when a wheel rotates, when the teeth plate 18 cuts the magnetic flux of a magnet 5, electromotive force occurs in a coil 3.

[0034] With the lead wire 25 laid along the slot 12 of an axle 2, the electromotive force of a coil 3 is pulled out by the exterior of a rim, and electric power is supplied to it by electric load. in addition, when it cannot decrease to required extent, the magnetic reluctance of a magnetic path The part of foot 18a of the teeth plate 18 and side plates 8a and 8b which has contacted is connected by welding etc. reduce the magnetic reluctance of the contact part of foot 18a of the teeth plate 18, and side plates 8a and 8b, or The nut 25 of the magnetic substance is fastened to screw section 2a formed in the axle 2 shown in drawing 1 as shown in drawing 7 , and the magnetic reluctance between side plates 8a and 8b and an axle 2 can be reduced.

[0035] Thus, compared with the former, the teeth plate 18 makes the multipolar DYNAMO for bicycles a minor diameter, and can be realized while there is little strong lowering and the engine performance improves, even if it extends the die length of teeth for a long time since it inserts in the slit 9 of electric insulating plates 7a and 7b and constitutes so that the direction of board thickness may gather in the direction which intersects the hand of cut of said hub.

[0036] So that drawing 5 may be seen and understood the heights 15a and 15b for the alignment of electric insulating plate 7a, side plate 8a, and electric insulating plate 7b and side plate 8b, and the location of Breakthroughs 16a and 16b Since only theta (1/2) instead of 180-degree phase contrast could be shifted intentionally and formed, the alignment of the side plates 8a and 8b on either side is easy, and since electric insulating plate 7a, electric insulating plate 7b, and side plate 8a and side plate 8b can be managed with the components of the same configuration, moreover, the cutback of components classes is realizable.
[0037] As opposed to breakthrough 16of side plate 8a a specifically engaging with heights 15of electric insulating plate 7a of left-hand side shown in (b) of drawing 5 a, and breakthrough 16b of side plate 8a engaging with heights 15b On the right-hand side shown in (d) of drawing 5 , while making side plate 8b inside-out to electric insulating plate 7b Only by making breakthrough 16of side plate 8b b engage with heights 15a of electric insulating plate 7b, and making breakthrough 16a of side plate 8b engage with heights 15of electric insulating plate 7b b The teeth plate 18 prolonged toward right-hand side from the left-hand side of a coil 3 as the alignment of the side plates 8a and 8b on either side is completed and it was shown in drawing 6 , The configuration to be able to insert in a slit 9 by turns the teeth plate 18 prolonged toward left-hand side from the right-hand side of a coil 3 is realized by few components classes.
[0038] (Gestalt 2 of operation) Drawing 8 shows (the gestalt 2 of operation). Although rings 19 and 19 were attached in the ends of the teeth plate 18 and installation by the side of the axle 2 of many teeth plates 18 was ensured with the above-mentioned (gestalt 1 of operation) while inserting in the slit 9 of electric insulating plates 7a and 7b and holding this (gestalt 2 of operation) -- **** -- concave 26 is formed near the center of the teeth plate 18, after setting each teeth plate 18, the insulating tape 28 of an insulator can be made for the annular coil spring 27 to be able to intervene in magnetism, and both the teeth plates 18 can also be bound tight. Also in this case, rings 19 and 19 can also be used together.
[0039]
[Effect of the Invention] The side plate by which many magnetic poles were formed as mentioned above in the periphery section with the disc-like magnetic substance arranged by approaching the magnetic pole of a coil in the stator according to the DYNAMO for bicycles of this invention, It constitutes from a teeth plate with which the end face section carried out magnetic connection to said magnetic pole of a side plate the tabular magnetic substance, and the head was installed toward the magnetic pole of another side. It can multipolarize, even if the direction of board thickness can be characterized by arranging said teeth plate in the direction which intersects the hand of cut of said hub, can raise the consistency of the teeth of the hoop direction of a hub and does not major-diameter-ize a hub.
[0040] Moreover, the slit of a large number according to the board thickness of said teeth plate is formed in the periphery section with a disc-like non-magnetic material, and when the electric insulating plate which performs spacing of the teeth plate which holds said teeth plate and adjoins is formed, it can hold certainly into the position aiming at said teeth plate.
[0041] Moreover, it can hold certainly into the position aiming at said teeth plate prolonged in the other end from the end of a coil by equipping the axle of a hub with a side plate and an electric insulating plate in piles so that a magnetic pole may be formed in the periphery of a side plate in a pitch twice the pitch of the slit of an electric insulating plate and the slit of said electric insulating plate may be located in the mid-position of the location of the magnetic pole of a side plate, a magnetic pole, and a magnetic pole.
[0042] Moreover, the slot which engages with the projection formed in the inner circumference section of an electric insulating plate is established in the peripheral surface of the axle of a hub along with the longitudinal direction of said axle. When the crevice and heights which are engaged in the condition that the slit of said electric insulating plate is located in the mid-position of the location of the magnetic pole of a side plate, a magnetic pole, and a magnetic pole are formed in the mutual contact side of the electric insulating plate with which the axle of a hub is equipped in piles, and a side plate, the mutual alignment of an axle, an electric insulating plate, and a side plate is completed.
[0043] Furthermore, the slot for positioning of an electric insulating plate is formed in the peripheral surface of the axle of a hub at the longitudinal direction of an axle. The heights which engage with the same location in said slot are formed in the inner skin of a mutual electric insulating plate so that the pitch of a mutual electric insulating plate may gather in the condition the electric insulating plate of two sheets which opened and equipped the aforementioned axle with spacing. Heights are prepared in the end face of the electric insulating plate of the mutual contact sides of said electric insulating plate with which the axle of a hub is equipped in piles, and a side plate. By only 1/2 pitch of a slit being able to shift the location of said through hole which formed in the end face of a side

plate the through hole which engages with said heights, and was established in said side plate to a hoop direction, and forming it in it to said heights of an electric insulating plate The components of the configuration same as the electric insulating plate and side plate of right and left of an axle can be used, and the cutback of components classes can be attained.

[0044] Moreover, in support of a long and slender teeth plate, multipolarization is realizable for stability by forming the electric insulating plate by which many slits were formed in the periphery section with a disc-like non-magnetic material, carrying out magnetic connection of the end face section of said teeth plate to one side plate of the side plates of said couple, engaging with the slit of said electric insulating plate, and holding the point of said teeth plate.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The important section sectional view of the DYNAMO for bicycles of the (gestalt 1 of operation) of this invention
[Drawing 2] The decomposition perspective view of the important section of the gestalt of this operation
[Drawing 3] The top view of the electric insulating plate of the gestalt of this operation
[Drawing 4] The top view of the side plate of the gestalt of this operation
[Drawing 5] The explanatory view of the superposition of the electric insulating plate of right and left of the gestalt of this operation, and a side plate
[Drawing 6] The perspective view showing the insertion process of the teeth plate of the gestalt of this operation
[Drawing 7] The sectional view showing another example of the assembly of the gestalt of this operation
[Drawing 8] The perspective view showing the important section of (the gestalt 2 of operation)
[Drawing 9] The sectional view of the conventional DYNAMO for bicycles
[Drawing 10] The cross-sectional view of the example of ******
[Drawing 11] The sectional view of the stator of the example of ******
[Description of Notations]
6 Fork of Bicycle Frame
1 Hub
2 Axle
3 Coil
7a, 7b Electric insulating plate of non-magnetic material
8a, 8b Side plate which consists of the magnetic substance
9 Slit of Electric Insulating Plate
10 Leg of Side Plate
12 Slot on the Axle
13a, 13b Projection of an electric insulating plate
15a, 15b Heights formed in the end face of an electric insulating plate
16a, 16b Breakthrough of a side plate
18 Tabular Teeth Plate Which Consists of the Magnetic Substance

[Translation done.]

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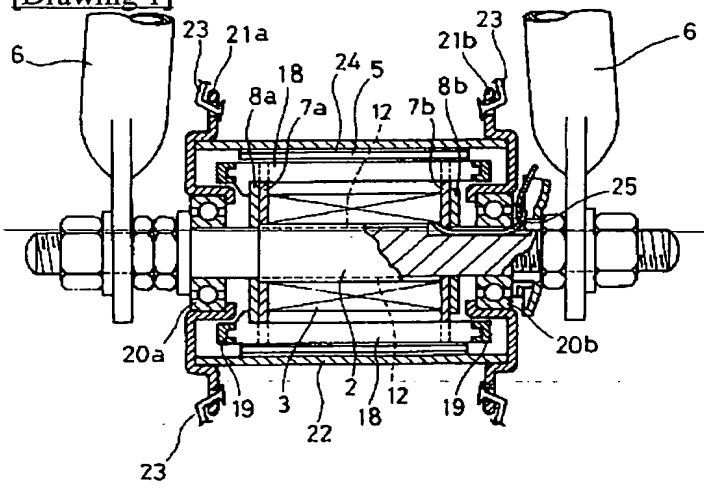
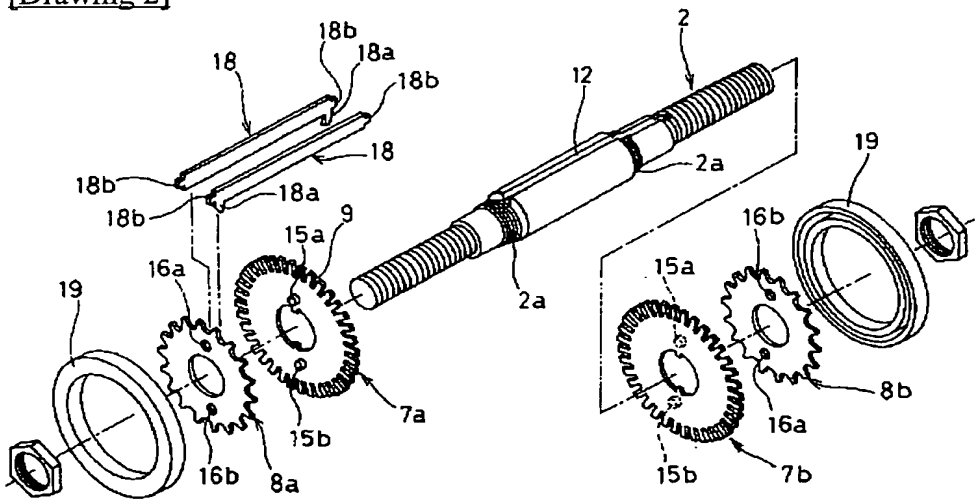
DRAWINGS

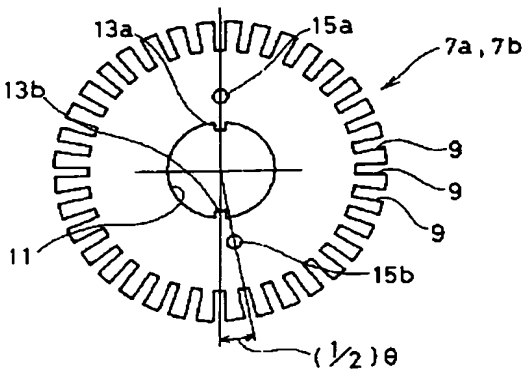
[Drawing 1]



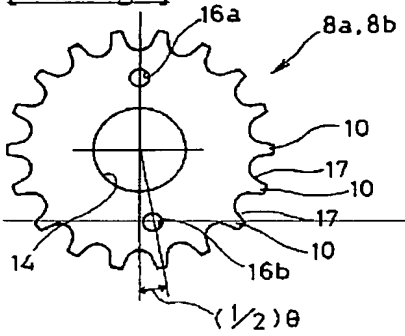
[Drawing 2]



[Drawing 3]



[Drawing 4]



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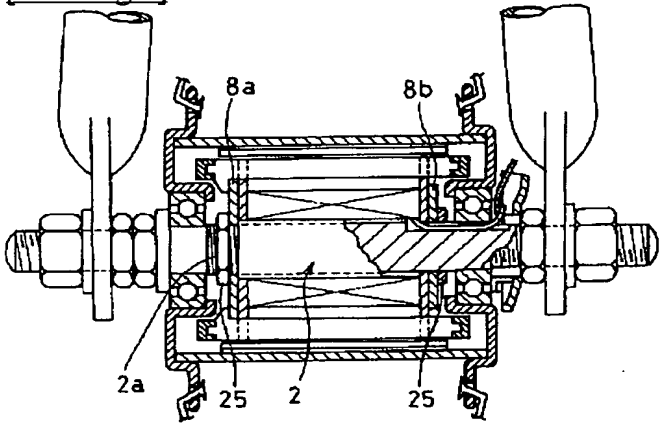
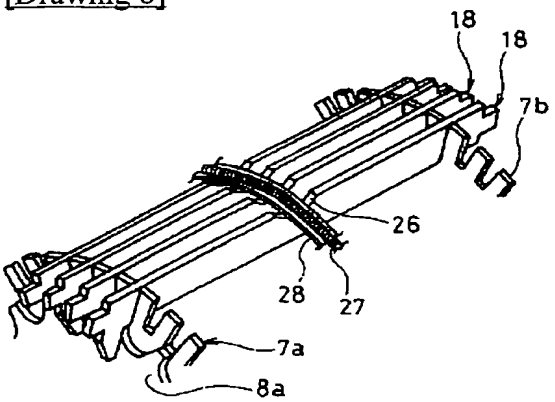
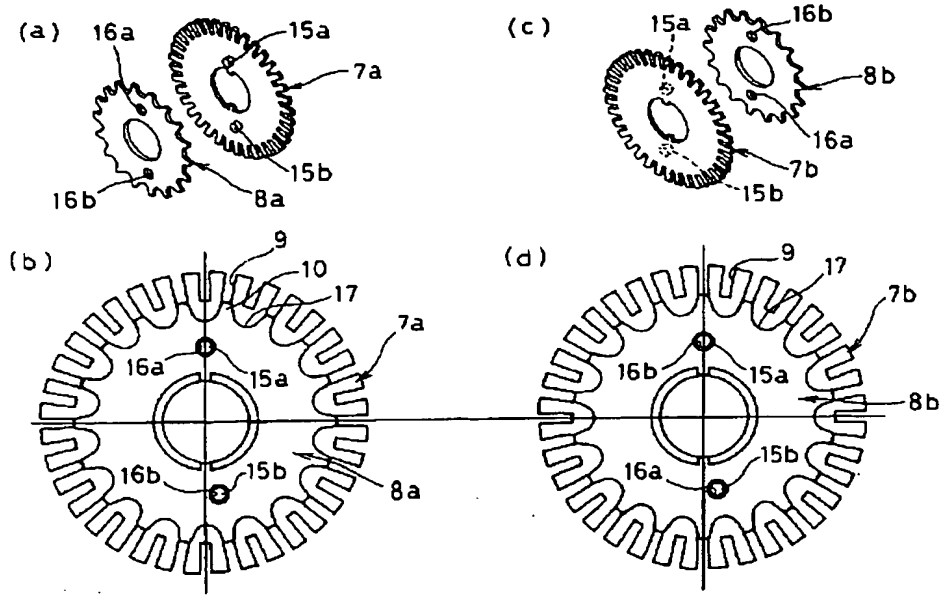


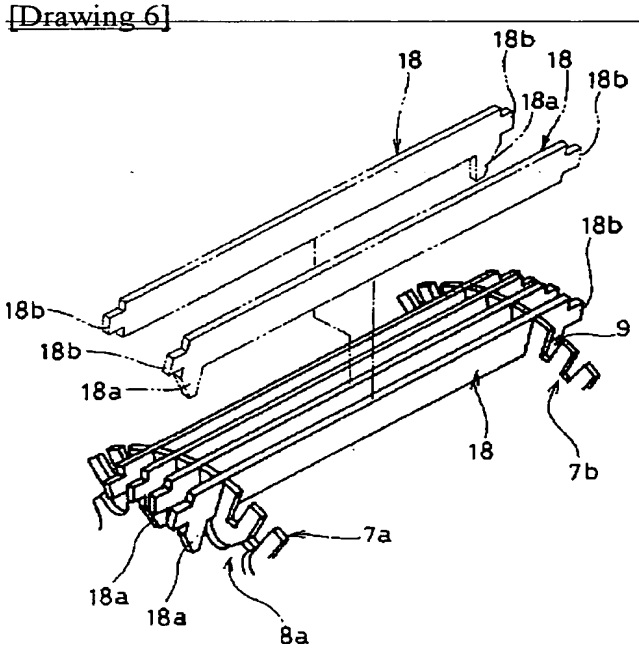
[Drawing 8]



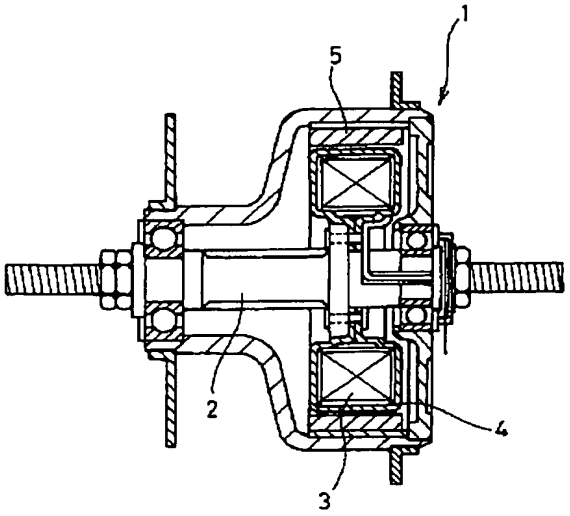
[Drawing 5]



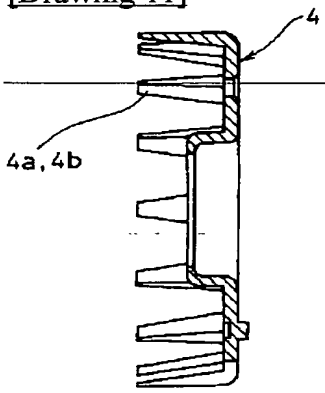
[Drawing 6]



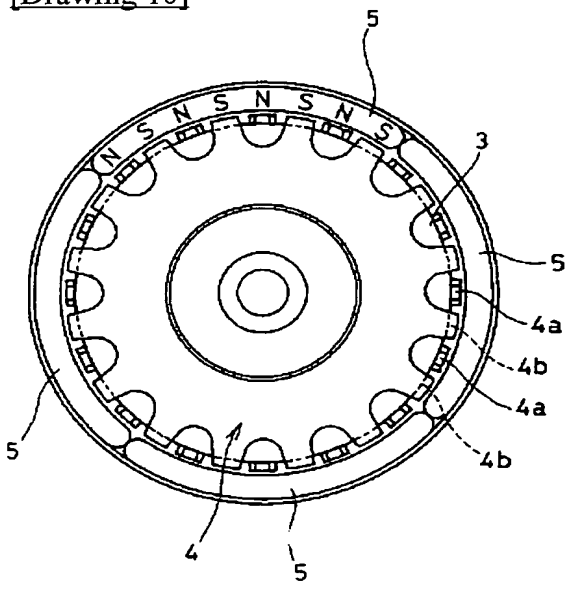
[Drawing 9]



[Drawing 11]



[Drawing 10]



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